REMEDIAL ACTION MANAGEMENT PLAN

LANDFILL REMOVAL
FORMER NPD LABORATORY
TROUTDALE, OREGON

Prepared for:

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TABLE OF CONTENTS

1.0 INTRODUCTION 1-1

2.0 SITE DESCRIPTION AND BACKGROUND 2-1
2.1 SITE LOCATION, DESCRIPTION, AND TOPOGRAPHY 2-1
2.2 GENERAL SITE HISTORY 2-1
2.3 GEOLOGY 2-3
2.4 HYDROGEOLOGY 2-3

3.0 PREVIOUS INVESTIGATIONS 3-1
3.1 PRELIMINARY ASSESSMENT – 1991 3-1
3.2 UNDERGROUND STORAGE TANK REMOVAL – 1993 3-1
3.3 ENVIRONMENTAL REVIEW GUIDE FOR OPERATIONS – 1994 3-1
3.4 PRELIMINARY SITE CHARACTERIZATION – 1995 3-2
3.5 ENVIRONMENTAL BASELINE SURVEY – 1997 3-2
3.6 GROUNDWATER SURVEY – 1998 3-3
3.7 SOIL REMOVAL AND GROUNDWATER SAMPLING – 1999 3-3
3.8 SITE INVESTIGATION – 2001 THROUGH 2002 3-4
3.9 SOIL AND SEDIMENT REMOVAL –2003 3-4
3.10 LANDFILL REMOVAL ACTION – 2003 3-4

4.0 PROJECT ORGANIZATION AND RESPONSIBILITIES 4-1
4.1 USACE PROJECT MANAGER: MICHAEL GROSS, USACE PORTLAND DISTRICT 4-1
4.2 USACE SMALL PROJECTS TECHNICAL TEAM LEADER: MAMIE BROUWER, USACE SEATTLE DISTRICT 4-1
4.3 USACE SMALL PROJECTS TEAM LEADER: BRANDI DENNIS-PEÑA, USACE SEATTLE DISTRICT 4-1
4.4 USACE CONSTRUCTION QUALITY ASSURANCE REPRESENTATIVE: MICHAEL MORAN, USACE, PORTLAND DISTRICT 4-2
4.5 CONTRACT MANAGER: RHONDA HERSCHELL, CHEROKEE 4-2
4.6 PROJECT MANAGER: CLIFF BROWN, CHEROKEE 4-2
4.7 CONSTRUCTION QUALITY CONTROL SYSTEM MANAGER: ROB COPHER, CHEROKEE 4-2
4.8 FIELD SUPERINTENDENT: ROB COPHER, CHEROKEE 4-2
4.9 PROJECT CHEMIST: CHRISTINE RANSOM, ECOCHEM, INC. 4-3
4.10 LABORATORY: SEVERN TRENT LABORATORIES, INC. 4-3
4.11 WASTE DISPOSAL: WASTE MANAGEMENT, INC. 4-3

5.0 REMOVAL AND DISPOSAL APPROACH 5-1
5.1 DATA QUALITY OBJECTIVES 5-2
5.2 TASK 1: WASTE CHARACTERIZATION 5-2

5.2.1 Subtask 1A: Site Survey and Grid Staking 5-2
5.2.2 Subtask 1B: In-Situ Waste Characterization 5-3
5.3 TASK 2: SITE PREPARATION 5-4
5.3.1 Subtask 2A: Equipment and Facilities Mobilization 5-4
5.3.2 Subtask 2B: Clearing and Grubbing 5-4
5.3.3 Subtask 2C: Erosion Control and Security Fencing 5-4
5.3.4 Subtask 2D: Site Access Road Construction 5-5
5.3.5 Subtask 2E: Truck Decontamination Pad Construction 5-5
5.3.6 Subtask 2F: Roll-Off Staging Area Construction 5-5
5.4 TASK 3: WASTE EXCAVATION 5-5
5.4.1 Subtask 3A: Dust Control 5-6
5.4.2 Subtask 3B: Waste Excavation and Loading 5-6
5.4.3 Subtask 3C: Segregation of Waste Inconsistent with Profile 5-6
5.4.4 Subtask 3D: Characterization of Waste Inconsistent with Profile 5-6
5.4.5 Subtask 3E: Roll-Off Pickup and Stockpile Removal 5-7
5.4.6 Subtask 3F: Sub-grade Excavation, Stockpiling, and Characterization 5-7
5.4.7 Subtask 3G: Additional Incidental Excavation and Material Removal 5-7
5.5 TASK 4: CONFIRMATION SAMPLING AND SITE CLEANUP 5-7
5.5.1 Subtask 4A: Confirmation Sampling 5-7
5.5.2 Subtask 4B: Backfill Sampling 5-8
5.5.3 Subtask 4C: Backfill, Grading, and Compaction 5-8
5.5.4 Subtask 4D: Site Cleanup 5-8
5.5.5 Subtask 4E: Seeding 5-8

6.0 REFERENCES 6-1

APPENDICES

APPENDIX A – SAMPLING AND ANALYSIS PLAN

APPENDIX B – SITE SAFETY AND HEALTH PLAN

APPENDIX C – CONTRACTOR QUALITY CONTROL PLAN

FIGURES

FIGURE 1 – VICINITY MAP.. 1-2

FIGURE 2 – SITE MAP 2-4

FIGURE 3 – LANDFILL REMOVAL ACTION MATERIAL MANAGEMENT PROCESS.. 5-16

FIGURE 4 – TRUCK DECONTAMINATION PAD.. 5-17

TABLES

TABLE 4-1 PROJECT PERSONNEL AND CONTRACTOR CONTACT INFORMATION 4-3

TABLE 5-1 CLEANUP ACTION LEVELS 5-9

TABLE 5-2 LANDFILL REMOVAL ACTION; DATA QUALITY OBJECTIVES 5-15

ABBREVIATIONS AND ACRONYMS

ASTM	American Society for Testing and Materials
bgs	below ground surface
Cherokee	Cherokee General Corporation
CLP	Contract Laboratory Program
COPCs	chemicals of potential concern
COR	Contracting Officer's Representative
CQC System Manager	Construction Quality Control System Manager
CQCP	Contractor Quality Control Plan
DEQ	Oregon Department of Environmental Quality
DQO	data quality objective
DRO	total petroleum hydrocarbons as diesel-range-organics
EBS	Environmental Baseline Survey
EPA	U.S. Environmental Protection Agency
ERGO	Environmental Review Guide for Operations
Farallon	Farallon Consulting, L.L.C.
FSP	field sampling plan
mg/kg	milligrams per kilogram
ORO	total petroleum hydrocarbons as oil-range-organics
PA	preliminary assessment
PCBs	Polychlorinated biphenyls
PID	photoionization detector
PM	project manager
PPE	personal protective equipment
ppm	part per million
PRGs	preliminary remediation goals
QA	quality assurance
RAMP	Remedial Action Management Plan
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
STL	Severn Trent Laboratories, Inc.

SI	site investigation
SSHO	Site Safety and Health Officer
SSHP	Safety and Health Plan
SVOCs	semivolatile organic compounds
TCA	1,1,1-trichloroethane
TPH	total petroleum hydrocarbons
URS	URS Corporation
UST	underground storage tank
VOCs	volatile organic compounds

1.0 INTRODUCTION

This Remedial Action Management Plan (RAMP) has been prepared by Farallon Consulting, L.L.C. (Farallon) on behalf of Cherokee General Corporation (Cherokee). Cherokee is operating under Contract No. DACA67-00-D-1009 to the U.S. Army Corps of Engineers (USACE) Seattle District to conduct the removal action chosen for the former North Pacific Division (NPD) laboratory site (the Site) (Figure 1) in accordance with the contract technical specifications. The work is being conducted as a follow-up remedial action to the *Draft Final Site Investigation Report* (DFSI) prepared by URS Corporation (URS) for the USACE Seattle District, dated August 30, 2002 (URS 2002). Based on the conclusions and recommendations in the DFSI, the objective of the remedial action is to remove and dispose of the landfill contents in accordance with applicable laws and regulations. This work is being conducted as a voluntary cleanup interim removal action consistent with the state of Oregon Department of Environmental Quality Voluntary Cleanup Program

The Sampling and Analysis Plan (SAP) for the removal action is attached as Appendix A to the RAMP. The Site-specific Safety and Health Plan (SSHP) and the Contractor Quality Control Plan (CQCP) are attached as Appendices B and C, respectively.

2.0 SITE DESCRIPTION AND BACKGROUND

This section describes the Site location, setting, history, geology, and hydrogeology. The information summarized in this section was taken from the *Final Management Plan for Site Investigation Report* prepared by URS for the USACE Portland District, dated August 31, 2001 (URS 2001).

2.1 SITE LOCATION, DESCRIPTION, AND TOPOGRAPHY

The former NPD laboratory facility is located on 6.43 acres in the city of Troutdale, in Multnomah County, Oregon. The property is located at 1491 NW Graham Road, in the southwest quadrant of Section 24, Township 1 North, Range 3 East Willamette Meridian (USGS 1993). In its present configuration, the Site consists of a northern parcel and a southern parcel of land divided by Graham Road (Figure 2). The area is primarily industrial, and is zoned for general manufacturing.

The northern parcel is undeveloped and is occupied by a landfill, which covers approximately one-third of an acre. The parcel is bordered to the south by NW Graham Road, and to the north, east, and west by undeveloped land owned by the Reynolds Metals Company.

Present structures on the southern parcel include a 65,000-square-foot building that formerly housed the USACE NPD materials testing laboratory and a warehouse (Figure 2). Two small buildings are present east of the main building, which were used to store hazardous materials and oil drums. A small fenced enclosure with a concrete pad (a former electrical transformer enclosure) lies adjacent to the east side of the building, with six pole-mounted transformers present directly above it. Two large mobile trailers north of the main building, which once housed the USACE Portland District Resident Office, currently are being used by Mt. Hood Community College. The southern parcel is bordered to the north and the east by NW Graham Road, and to the south by the Troutdale Airport. To the west is a warehouse that is occupied by the U.S. Forest Service. Land to the east is occupied by the city of Troutdale wastewater treatment plant, and by a construction contractor.

2.2 GENERAL SITE HISTORY

The NPD laboratory operated at 1491 Graham Road from 1949 until the spring of 1997. The laboratory was used as a materials testing facility for the entire period of operation. In 1979, the NPD laboratory property was divided by an easement for the extension of NW Graham Road. In 1986, the laboratory expanded operations within the warehouse facility, and began analyzing samples from hazardous and toxic waste sites. Analysis of hazardous and toxic samples continued until operations ceased in 1997.

The main building has several sink and floor drains that lead to a common drain header exterior to the building, and then to a concrete sump located on the east side of the building (Figure 2). All drains discharged to this sump, except for those from the lavatories and the freeze/thaw room. The lavatory drains discharged directly to the sanitary sewer, and the freeze/thaw drains discharged directly to a north/south-trending drainage ditch, which runs along the eastern perimeter of the Site. The sump also discharged into the drainage ditch. In 1996, the effluent from the sump and the lavatories was connected to the local sanitary sewer system. In addition, two concrete raceways that served as floor drains discharged directly into the drainage ditch until they were blocked in 1996. The soils within the drainage ditch are coarse-grained and highly permeable, which generally promotes infiltration of the discharge into underlying soils. The drainage ditch terminates just north of the property.

The drainage ditch reportedly received untreated discharges from the laboratory materials testing operations (Tetra Tech 1999). The discharges included wastewater generated during washing and testing of soils, aggregate, and concrete; and from wet chemistry water quality testing. This wastewater had characteristic concrete admixtures such as lignins and sulfates. The reagents associated with water quality testing, including large quantities of mercury and silver salts, were routinely flushed down the drains. Other materials that were flushed down the sink drains included acids, bases, and trace amounts of laboratory solvents such as methylene chloride, acetone, and hexane. Dilute solutions of metals (less than 1 part per million [ppm]) and indicator dyes such as methylene blue and green also were disposed of through the sink drains. Samples received from hazardous and toxic waste sites were containerized and appropriately disposed of off site.

A dry well existed in the southeast portion of the Site from 1950 until 1999, when it was removed and the surrounding soil was excavated. The dry well was constructed of approximately 20 inches of gravel overlying the native soil, and a 9-inch diameter vertical, open-ended concrete pipe. The gravel layer extended beyond the vertical pipe for an unknown distance. The dry well was used for waste disposal from approximately 1950 until 1980 or 1981, during which time viscous wastes were poured directly into the dry well. Wastes included oil-based paint and asphalt samples that had been dissolved in solvents. Polychlorinated biphenyls (PCBs), lead, chromium, and cadmium may have been in the paints tested at the lab. A zinc powder was used in paint testing at the lab. The solvents used included ether, benzene, and 1,1,1-trichloroethane (TCA) mixed with alcohol. In addition, trichloroethene may have been used as a solvent prior to the late 1970s. Asphalt that was tested may have contained PCBs and oils. Disposal of these materials in the dry well was discontinued some time between 1980 and 1981. Approximately 45 gallons of dissolved paint and asphalt samples is conservatively estimated to have been disposed of in the dry well between 1950 and 1981, when the disposal practice ended.

A 10,000-gallon underground storage tank (UST) located west of the main building was decommissioned and removed in 1993. The tank was used to store oil for the building's boiler-fired heating system. Approximately 10 cubic yards of contaminated soil were excavated during tank removal activities.

The northern portion of the Site property historically was used as a landfill for disposal of residual bulk materials such as gravel aggregate and concrete that had been tested. The landfill also was used to dispose of solid waste material such as steel drums of hardened concrete, asphaltic paper, and fiberglass insulation. The landfill was unlined, and all material was placed directly over native soil. Structural concrete test pours were conducted in 1952 southeast of the landfill, and in the early 1980s southwest of the landfill. Use of the landfill for material disposal ceased in 1994.

2.3 GEOLOGY

The Site is located near the confluence of the Sandy and Columbia Rivers. The Site is in the Columbia River floodplain and has been protected from 500-year floods by USACE levees. The area is described as Quaternary-age alluvium, including catastrophic flood deposits underlain by the Pleistocene Cascadian conglomerate, a volcaniclastic conglomerate derived from the uplifted Cascade Range (Tetra Tech 1999).

Soil in the area is classified as Faloma silt loam (USDA 1983). This soil is poorly drained, and is characteristic of the floodplains of the Columbia River. Permeability reportedly increases with depth (Tetra Tech 1999). According to boring logs from the monitoring well installations (Tetra Tech 1998), subsurface soils predominantly consist of brown, coarse-grained, well-graded, well-rounded sand. The sand becomes coarser with depth. Cobbles and silt occasionally can be encountered.

2.4 HYDROGEOLOGY

According to a study of the adjacent Reynolds Metals site located approximately 0.25 miles north-northwest of the former NPD laboratory site, the project area is underlain by two aquifers (CH2M Hill 1996). The upper aquifer is in unconsolidated sedimentary deposits and extends to a depth of 250 feet below ground surface (bgs). The deeper sand and gravel aquifer is hydraulically connected to the upper aquifer. The unconformable contact between the two aquifers is permeable.

Groundwater studies conducted at the Site indicate that a shallow unconfined aquifer is found at a depth ranging between 3 and 12 feet bgs throughout the wet season (Tetra Tech 1998). However, the water table can be as high as 1 foot bgs in the peak wet season. Due to the Site's proximity to the Sandy and Columbia Rivers, groundwater levels are highly variable. The groundwater flow direction is toward the north-northwest (Tetra Tech 1999). The surface drainage trends to the north toward the Columbia River. The Site is approximately 30 feet above mean sea level (USGS 1993) and generally has a flat topography.

3.0 PREVIOUS INVESTIGATIONS

Included in the following section is a description of all previous investigations conducted at the Site. The information provided in this section was taken from the *Final Management Plan for Site Investigation, Work Plan* prepared by URS for the USACE Seattle District, dated August 31, 2001.

3.1 PRELIMINARY ASSESSMENT – 1991

A preliminary assessment (PA) was conducted for the Site in 1991 by the USACE (USACE 1991). The former NPD laboratory had been identified in 1991 as a large quantity generator under the Resource Conservation and Recovery Act (RCRA) regulations for disposal of methanol from the concrete freeze/thaw test apparatus. The PA documented past and current waste handling and disposal practices of the laboratory. Based on the results of the PA, the U.S. Environmental Protection Agency (EPA) recommended No Further Action at the site. EPA rescinded this finding in October 2000.

3.2 UNDERGROUND STORAGE TANK REMOVAL – 1993

Martech USA, Inc. was given the responsibility by the USACE to remove one 10,000-gallon UST located near the main building at the Site. The UST was buried within a concrete vault with sand to a depth of 6 feet. Approximately half of the tank and vault were above ground. The tank reportedly was used to store Number 5 fuel oil used for heating purposes.

In March 1991, the tank was removed from service and the remaining fuel oil (3,401 gallons) was emptied from the tank by another party. Martech USA, Inc. subsequently removed the tank in 1993. The final confirmation sampling analytical results identified diesel-range petroleum hydrocarbon contamination in the subsurface soils located within the concrete vault at a maximum concentration of 1,830 milligrams per kilogram (mg/kg). As a result of the findings, 10 cubic yards of petroleum-contaminated soils were excavated from the vault and transported off site for disposal. The excavation area was backfilled and compacted to grade. Confirmation samples indicated that the contamination was limited to the soil within the concrete vault (USACE 1998).

3.3 ENVIRONMENTAL REVIEW GUIDE FOR OPERATIONS – 1994

In 1994, an internal compliance assessment was performed for the Portland District USACE by Woodward-Clyde Consultants (Woodward-Clyde 1995), under the Environmental Review Guide for Operations (ERGO) program. The assessment, which included a site visit and a review of all past and present waste management procedures, identified several areas of concern:

- Solid waste disposal in the unlined landfill on the northern portion of the property;

- Collection of wastewater from the laboratory drains into the sump and subsequent discharge of wastewater to the drainage ditch; and
- Disposal of viscous chemical waste in the shallow dry well.

The subsequent report made several recommendations to prevent further impact to soil and water at the NPD laboratory site. The recommendations included:

- Discontinuing any of the above-mentioned practices that were still taking place;
- Connecting the sump to the sanitary sewer system;
- Characterizing and disposing of all waste and samples that were still stored on the Site; and
- Properly abandoning an unused water well located on the Site.

All of the recommendations were implemented and no further actions were taken at that time.

3.4 PRELIMINARY SITE CHARACTERIZATION – 1995

In 1995, the USACE implemented a limited soil-sampling program to assess potential impacts of laboratory disposal practices on the drainage ditch and dry well area. One surface soil sample was collected from the drainage ditch and analyzed for the presence of metals, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs). Arsenic and chromium were detected at concentrations that exceeded EPA screening levels.

Two samples were collected from the dry well area, including one in a tar layer at the base of the gravel, and one from the native soil beneath the tar and gravel. These samples were analyzed for the presence of metals, VOCs, SVOCs, and PCBs. Results indicated that chromium, Aroclor®-1260, TCA, toluene, and bis (2-ethylhexyl) phthalate were detected in the tar sample at concentrations greater than EPA screening levels. Oil-range petroleum hydrocarbons and mercury also were detected.

3.5 ENVIRONMENTAL BASELINE SURVEY – 1997

In 1997, Tetra Tech, Inc. (Tetra Tech) was contracted by the USACE to conduct an Environmental Baseline Survey (EBS) of the Site to determine whether adverse impacts to the environment had occurred as a result of laboratory activities. Soil and groundwater samples were collected and analyzed for VOCs, SVOCs, and RCRA priority pollutant metals at the sump, drainage ditch, drywell area, and landfill (Tetra Tech 1997).

The most significant impacts to the environment were determined to be elevated metal concentrations (at levels higher than background levels) in the drainage ditch soil and in four groundwater samples. The study did not include any remedial action, but identified several areas of concern for further action.

3.6 GROUNDWATER SURVEY – 1998

Six monitoring wells were installed at the Site to investigate the metals identified in groundwater in the 1997 EBS (Tetra Tech 1997). Tetra Tech sampled each well in April and May of 1998 (Tetra Tech 1998). Results of the April sampling indicated that total arsenic, lead, and cadmium concentrations exceeded EPA screening levels. The May results indicated that total arsenic and lead concentrations exceeded EPA screening levels only in shallow samples collected from the northern portion of the Site. Dissolved metals were not detected above screening levels in the groundwater samples collected during either sampling event. Based on these findings, Tetra Tech recommended that one additional sampling event be conducted to document groundwater quality following removal of the dry well and drainage ditch soil.

3.7 SOIL REMOVAL AND GROUNDWATER SAMPLING – 1999

Tetra Tech, under contract to the USACE Portland District, conducted soil removals in the drainage ditch and dry well area in 1999 (Tetra Tech 1999). Approximately 30 cubic yards of soil were removed from the drainage ditch and were disposed of off site. Field personnel noted no obvious signs of contamination. The total excavation area measured 5 feet east to west, 40 feet north to south, and averaged 4 feet deep. Concrete cores were encountered during the excavation. Some of the cores were removed from the Site and were disposed of as investigation-derived waste. Other cores remained in place in the drainage ditch. Groundwater was encountered at a depth of 4 feet bgs during the excavation.

A total of 25 cubic yards of soil was removed from the dry well area and were disposed of off site. Dry well excavation was centered on the former dry well area, and measured 8 feet east to west, 14 feet north to south, and 5.5 feet deep. Soil samples were collected from the sidewalls and bottom of the excavation site to confirm that all contaminated soil had been removed. Staining was evident in the gravel that was encountered at 2.5 feet bgs, but no other evidence of contamination was apparent. The tar layer that had been encountered in 1995 was not encountered in 1999. A subsurface brick wall with an approximately 1.5-inch horizontal pipe was noted to be present adjacent to the excavation, and was left in place.

Samples of groundwater that pooled in the excavations and from the groundwater monitoring wells were collected in association with the removal. No contaminants were detected above screening levels in the grab soil samples collected from the dry well area and the drainage ditch soils. However, metals concentrations in standing water collected from the drainage ditch and in groundwater samples collected from the monitoring wells exceeded screening levels.

The USACE entered the Oregon Department of Environmental Quality (DEQ) Independent Cleanup Program in August 1999.

3.8 SITE INVESTIGATION – 2001 THROUGH 2002

On behalf of the Seattle District of the USACE, URS conducted a site investigation (SI) at the Site in September 2001. The investigation was conducted according to the guidelines and specifications described in the *Final Management Plan, Site Investigation, Former North Pacific Division Laboratory, Troutdale, Oregon;* dated August 2001 (URS 2001). The results of the SI were presented in the *Draft Final Site Investigation Report*, *USACE Former North Pacific Division Laboratory, Troutdale, Oregon;* dated August 2002 (URS 2002).

Analytical results of samples collected from exploratory trenches placed in the landfill identified elevated concentrations of two chemicals of potential concern (COPCs) (benzo(a)pyrene and arsenic) exceeding the risk-based EPA 2000 Region 9 industrial soil preliminary remediation goals (PRGs). Elevated levels of VOCs, SVOCs, and heavy oil-range petroleum hydrocarbons also were identified. However, these constituents were present at levels below the PRGs.

3.9 SOIL AND SEDIMENT REMOVAL –2003

Under contract to the USACE Small Projects Office in Tillicum, Washington, Cherokee performed a limited removal of sediments and soil from the Site in January 2003. This action was taken based on SI report recommendations (URS 2002).

The SI identified an accumulation of sediment and water in a concrete vault sump that received drainage from several drains within the laboratory. Laboratory analysis determined that sediments in the sump contained diesel-range petroleum hydrocarbons, motor oil-range petroleum hydrocarbons, VOCs, SVOCs, metals, and PCBs. The sump subsequently was cleaned and rinsed by Cherokee to remove all impacted soil and water.

PCBs (i.e., Arocolor® 1254) were detected at low concentrations in the surface soils under and around the pole-mounted transformers present near the former electrical transformer enclosure. Cherokee removed 3 inches of surface soil from inside the fence under the transformer pole, and from within 3 feet of the fence outside. Following removal of the surface soil, one confirmation soil sample was collected and analyzed for the presence of PCBs to ensure that all soil impacted with PCBs had been removed.

3.10 LANDFILL REMOVAL ACTION – 2003

The SI report (URS 2002) identified benzo(a)pyrene and arsenic at concentrations exceeding the PRG screening values in soil samples collected from the landfill. These contaminants represent a potential human health risk and have been designated chemicals of potential concern (COPCs). The SI recommendations included removal of the landfill contents using industrial soil PRGs as guidance values for cleanup. Cherokee, under contract to the Seattle District of the USACE, has been contracted to perform the removal of the landfill contents, based on the SI report recommendations. To accomplish this goal, Cherokee will:

- Characterize the landfill contents;
- Prepare the Site for excavation operations by clearing the work area, constructing access roads and work areas, and installing erosion control measures;
- Excavate and remove the landfill contents for disposal, segregating any materials that are not consistent with the landfill contents waste profile;
- Sample, characterize, and dispose of any materials segregated during excavation operations that are not consistent with the landfill contents waste profile;
- Conduct confirmation sampling to ensure that cleanup goals have been achieved; and
- Restore the Site by backfilling, grading, and hydroseeding.

The 2000 Region 9 PRGs were updated subsequent to the publication of the SI. The updated values were published in October 2002. This removal action will be performed using the 2002 PRGs as cleanup action goals. All references to PRGs in the text are in reference to the 2002 PRGs.

Both the 2000 PRGs used to develop the SI and the 2002 PRGs applied to this project are presented in the tables.

4.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The primary USACE and Cherokee personnel and roles assigned to this project are described in this section. USACE, Cherokee personnel, and subcontractor contact information is presented at the end of this section.

4.1 USACE PROJECT MANAGER: MICHAEL GROSS, USACE PORTLAND DISTRICT

The USACE Project Manager (PM) will maintain specific project management authority throughout the duration of the project. The PM is responsible for overall management and execution of the project, including overseeing project quality, cost, and schedule. Among the USACE PM's specific tasks are the following:

- Tracking and reporting financial expenditures, obligations, and schedule to the USACE Northwest Division;
- Facilitating the resolution of issues arising during the project;
- Serving as the Construction Quality Assurance (QA) Representative, on-Site point-of-contact, and the 24-hour contact for the Department of Transportation; and
- Conducting all work inspections, approving progress payments, signing waste profiles, and reporting to the USACE Small Projects Technical Team Leader.

4.2 USACE SMALL PROJECTS TECHNICAL TEAM LEADER: MAMIE BROUWER, USACE SEATTLE DISTRICT

The Technical Team Leader is the technical point-of-contact for this investigation, responsible for keeping the USACE PM informed of project schedule, budget, and any changes. Ms. Brouwer has overall responsibility for achieving the technical objectives of this project.

Ms. Brouwer will work closely with the Cherokee PM, will be notified immediately if problems occur, and will approve changes to the Sampling and Analysis Plan (SAP), if such changes are warranted. In the event that changes are needed, Ms. Brouwer will immediately notify the USACE PM, will discuss proposed changes, and will furnish a description of the changes.

4.3 USACE SMALL PROJECTS TEAM LEADER: BRANDI DENNIS-PEÑA, USACE SEATTLE DISTRICT

The Small Projects Team Leader serves as the Contracting Officer's Representative (COR) on all contractual issues affecting the project. Ms. Dennis-Peña will serve as the point-of-contact for Cherokee on contract issues, and will coordinate participation of other USACE team members as required.

4.4 USACE CONSTRUCTION QUALITY ASSURANCE REPRESENTATIVE: MICHAEL MORAN, USACE, PORTLAND DISTRICT

The USACE Construction Quality Assurance Representative will represent the USACE Project Manager in the field, and will be the day-to-day point of contact for the Cherokee Field Superintendent.

4.5 CONTRACT MANAGER: RHONDA HERSCHELL, CHEROKEE

The Contract Manager is responsible for Cherokee's overall project performance. While the Contract Manager will not direct the daily activities of the project, she will coordinate closely with the Cherokee Project Manager to ensure that the project is completed successfully.

4.6 PROJECT MANAGER: CLIFF BROWN, CHEROKEE

The Cherokee Project Manager (PM) has overall responsibility for implementing Cherokee project activities and monitoring the project progress. Mr. Brown is responsible for planning, scheduling, cost control, and completion of project tasks. He also has overall responsibility for the development and implementation of this management plan, for monitoring the quality of the technical and managerial aspects of the project, for interfacing with the USACE, and for ensuring the timeliness of all project deliverables. Mr. Brown will be responsible for accurate identification and classification of waste; determination of proper shipping names; identification of marking, labeling, packaging, placarding requirements, completion of waste profiles; hazardous waste manifests; PCB manifests; bill of ladings, exception and discrepancy reports; and all other environmental documentation.

4.7 CONSTRUCTION QUALITY CONTROL SYSTEM MANAGER: ROB COPHER, CHEROKEE

The Cherokee Construction Quality Control System Manager (CQC System Manager) will be responsible for project quality control and for implementing the USACE three-phase quality control system. The CQC System Manager will implement the CQC Plan and will coordinate closely with the Project Chemist in implementing the SAP.

4.8 FIELD SUPERINTENDENT: ROB COPHER, CHEROKEE

The Field Superintendent (FS) is responsible for the overall performance of the field operations including adherence to the SAP, scheduling, and serving as liaison with USACE representatives and with Cherokee subcontractors. The FS also will function as the Site Safety and Health Officer (SSHO), responsible for the safe conduct of all field work. As the SSHO, Mr. Copher will be responsible for the implementation of the Site Safety and Health Plan (SSHP), and will review its contents with all personnel; confirm that all personnel have received required health and safety training; establish personal protection levels; provide necessary personal protective equipment (PPE) and supplies; and correct any unsafe work practice.

4.9 PROJECT CHEMIST: CHRISTINE RANSOM, ECOCHEM, INC.

The Project Chemist will be responsible for implementing the SAP and ensuring that data quality objectives for all sampling activities are achieved. The Project Chemist will work closely with the PM, FS, and the laboratory to ensure that sampling activities and sample handling are accomplished in conformance with the SAP requirements.

4.10 LABORATORY: SEVERN TRENT LABORATORIES, INC.

Laboratory services will be provided by Severn Trent Laboratories, Inc. (STL)(formally Sound Analytical Services, Inc.). The STL Project Manager will coordinate with the Project Chemist to ensure that all laboratory procedures are carried out to meet the project data quality objectives described in the SAP. STL was the laboratory used to analyze samples collected during the SI.

4.11 WASTE DISPOSAL: WASTE MANAGEMENT, INC.

Trucking and waste disposal services for the project will be provided by Waste Management, Inc. Waste profiling and manifesting will be coordinated by the PM and the Waste Management project representative.

Table 4-1 presents all project personnel and subcontractors and the services they will provide for the project.

Table 4-1
Project Personnel and Contractor Contact Information

Name	Role	Contact Information
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5.0 REMOVAL AND DISPOSAL APPROACH

The removal and disposal approach for remedial actions at the Site is described in this section. The approach will involve characterizing the landfill contents in-place in sufficient detail to enable direct excavation into trucks that will remove the waste for disposal. The excavation operation will be closely monitored to ensure that any material uncovered during excavation operations that is inconsistent with the waste profile is segregated from the material removed for direct landfill. The segregated materials will be sampled and characterized separately to determine proper disposal requirements.

Based on the RI, it is anticipated that the landfill contents will be non-hazardous and suitable for direct disposal in a Subtitle D landfill. Further, it is anticipated that Level D or C PPE is appropriate for the management of the landfill contents. Should the in situ waste characterization determine these assumptions to be invalid, work will cease, and the USACE Contracting Officer's Representative will be notified.

In addition, should any condition be encountered as excavation progresses requiring an upgrade to Level B or A PPE to safely manage fieldwork, all work will cease, and the USACE Contracting Officer's Representative will be notified. Items or materials that would necessitate Level B or A PPE would include any sealed container potentially containing residual liquid, or sludge or soil that creates breathing zone organic vapor concentrations greater than 50 parts per million (ppm) as measured by a photoionization detector (PID).

The flow chart presented in Figure 3 schematically presents the waste removal management process, including the assessment and handling of those landfill contents that do not meet the non-hazardous waste profile requirements established during in situ characterization.

Following removal of the landfill contents, 6-inches of native material will be removed and stockpiled for characterization. The footprint of the landfill will then be sampled to confirm that cleanup action levels for the project have been met.

The cleanup action levels established for this project are the EPA 2002 Region 9 Soil Preliminary Remediation Goals (PRGs) for industrial property (October, 2002). Concentrations of COPCs in confirmation samples will be compared to the cleanup action levels. Additional excavation and removal will be performed if confirmation sample concentrations of COPCs are found to exceed the cleanup action levels. The 2002 Region 9 PRGs are presented in Table 5.1 at the end of this section. The Region 9 PRGs in effect when the RI was performed were published in 2000. The Region 9 PRGs were updated in October of 2002. Both are presented in Table 5.1.

Waste removed from the project site for disposal will <u>only</u> be sent to facilities in compliance with EPA Off-site Policy.

5.1 DATA QUALITY OBJECTIVES

Data quality objectives (DQOs) are quantitative and qualitative specifications designed to supply data of appropriate quality from field activities. Adhering to the DQO process ensures that sufficient data are collected for accurate decision-making without collecting unnecessary data.

The DQO processes for data collection locations are presented in Table 5-2 at the end of this section. The primary objectives of the landfill removal action sampling and analysis effort include the following:

- Collect a sufficient quantity of suitable-quality data to profile the contents of the landfill to make decisions regarding appropriate treatment and disposal options;
- Reliably confirm that removal activities are complete, with no contaminated soil or waste material remaining; and
- Ensure that no adverse impact to the environment resulting from past practices at the former NPD laboratory remains.

The types of data to be collected include analytical information pertaining to:

- Chemical contaminants in soil, and
- Contaminants in segregated waste material.

Soil and waste samples will be collected and analyzed as described in the Field Sampling Plan (FSP) and summarized in this section. The performance specification for each investigation method is based on the need to confirm that no contamination greater than the cleanup action levels established for this project (Table 5.1) remains at the locations investigated at the Site. Analyses will meet the method quality objectives defined in the QAPP and required to satisfy the DQOs.

The removal action will be divided into four tasks, which consist of a total of 20 subtasks. The tasks and subtasks are described below.

5.2 TASK 1: WASTE CHARACTERIZATION

Task 1 will include all subtasks necessary to characterize the landfill contents for removal and disposal. Among the activities are: surveying a control grid; excavating test pits; collecting soil samples; submitting the samples to the analytical laboratory for analysis; and using the results to profile the landfill contents for disposal.

5.2.1 Subtask 1A: Site Survey and Grid Staking

The objective of Subtask 1A is to establish the limits of the landfill that will be characterized in-situ and subsequently removed for disposal, and to establish a control grid that will be used to guide the in-situ waste characterization sampling.

The COR will walk the landfill Site with the Cherokee PM and mark the area that contains material from laboratory testing activities. The approximate extent of this area based on available background documentation is shown on Figure 2.

A control grid will be surveyed and staked over the area designated for removal activities. The grid will be established so that approximately 24 characterization samples are taken from within the landfill footprint. It is estimated that this approach will result in a grid of squares measuring approximately 30 feet on each side. The actual grid layout will be determined after the extent of removal activities is established in the field. This grid will be referenced to a fixed benchmark so that it can be re-established following waste removal.

5.2.2 Subtask 1B: In-Situ Waste Characterization

The objective of Subtask 1B is to characterize the landfill material prior to excavation for disposal. This characterization will be used to establish a waste profile for the bulk of the material that will be removed for disposal.

The in-situ characterization will be performed by excavating test pits at the center of each grid square and sampling the landfill material in the pit. The test pits will be excavated from the current landfill surface down to the native soil beneath the landfill.

Cherokee will use a Case 580 backhoe (or equivalent) to excavate each test pit. The test pits will be excavated from the surface down to the underlying undisturbed soil as determined by visual inspection. The pits will vary in depth from less than 3 feet to 12 feet. Soil removed from each test pit will be stockpiled adjacent to the pit. The test pits will be excavated to an extent that allows for visual logging of subsurface conditions from the ground surface. The test pits will be logged by a geologist who is registered in the state of Oregon. Soil samples representative of the vertical profile of the test pit will be collected using a sampler on a pole and the backhoe bucket as described in the SAP. Field personnel will not enter a test pit. Each test pit will be backfilled following sampling and logging.

Soil samples will be submitted to the analytical laboratory for analysis of VOCs, SVOCs, organochlorine pesticides/PCBs, total metals, strontium, uranium, total cyanide, total petroleum hydrocarbons (TPH) as diesel-range-organics (DRO), and TPH as oil-range-organics (ORO) using the analytical methodologies described in the SAP. Where constituent concentrations exceed 20 times the maximum concentration of contaminants for the toxicity characteristic, as listed in 40 CFR 261.20 Subpart C Characteristics of Hazardous Waste, TCLP will be performed to determine if the soil is a characteristic hazardous waste.

Analytical results of the soil sample collected from each test pit will be compared to the acceptance criteria for direct landfilling as a non-hazardous waste as described in CFR 40 261.20 – Subpart C, Characteristics of Hazardous Waste. Based on the data presented in the SI (URS

2002), it is anticipated that most, if not all, of the sample analytical results will be within the levels that would allow for disposal of the landfill material as a non-hazardous waste.

Non-Hazardous waste profiles will be prepared based on the test pit logs, soil sample analytical results, and generator knowledge. These profiles will then be used as a benchmark for comparison during excavation and loading activities. Excavated material consistent with the non-hazardous waste profile will be excavated and directly loaded into trucks for disposal as a non-hazardous waste suitable for direct landfill.

If any grids are found to contain constituent concentrations that prohibit direct placement in a landfill as a non-hazardous waste, those grids will be marked for segregation and re-sampled during field excavation operations.

5.3 TASK 2: SITE PREPARATION

Task 2 will include all subtasks necessary for preparing the Site for excavation and removal of the landfill materials. Site preparation will include clearing and grubbing, setting up erosion control and security measures, and constructing access roads, decontamination areas, and waste staging areas.

5.3.1 Subtask 2A: Equipment and Facilities Mobilization

The objective of this subtask is to mobilize to the Site all material and equipment required to execute the work. An office trailer will be moved onto the Site parking area across the road from the landfill. The trailer will be connected to power and telephone service for use during field activities. A portable toilet will be brought to the Site for use by on-Site personnel. A spill kit, erosion control materials, PPE, a Case 580 backhoe loader (or equivalent), a Caterpillar® 235 excavator (or equivalent), and other incidental materials will be mobilized and staged on Site.

5.3.2 Subtask 2B: Clearing and Grubbing

The objective of Subtask 2B is to remove all surficial vegetation in the area to be disturbed by construction activities. Brush and small tress that have overgrown portions of the landfill and those within 20 feet of the landfill footprint will be cleared and removed from the Site. Brush and small trees will be cut down with hand tools and chain saws. The waste will be chipped on-Site and transported off-Site for disposal. The two large trees adjacent to the landfill will be protected during construction.

5.3.3 Subtask 2C: Erosion Control and Security Fencing

The objective of Subtask 2C is to implement best management practices for erosion control and to secure the work site. Erosion control will consist of silt fencing placed around the limits of the construction area to intercept surface drainage. Additionally, bio-bags will be placed in existing drainage swales to intercept and filter runoff. Erosion control will be maintained for duration of project, and will not be removed without the approval of USACE.

The Site is surrounded by a 4-foot high wire fence. The only access to the Site is from NW Graham Road, located to the south of the landfill. The areas to the north, east, and west of the landfill are covered by small trees and thick brush, making the Site inaccessible from those directions. The existing fence will be improved at the entrance to the Site with a 6-foot high, locking, chain-link gate which will be kept locked at all times when work activities are not in progress.

5.3.4 Subtask 2D: Site Access Road Construction

A gravel access road and turn area will be constructed from NW Graham Road to the landfill as shown on Figure 2. The road will be constructed of 1.5-inch aggregate material, with a construction entrance made of 2-inch to 4-inch rock material placed to a depth of 6 to 12 inches. During the conduct of the work, the road will be re-graded and material will be added as required to maintain truck access.

5.3.5 Subtask 2E: Truck Decontamination Pad Construction

A truck decontamination pad will be constructed on the east side of the access road as shown on Figure 2. All vehicles will be required to pass over the decontamination pad for cleaning before leaving the Site.

The decontamination pad will be lined to capture truck wash water. Wash water will drain or be pumped to a containment area for sediment settling. Overflow from the containment area will be pumped to a storage tank. Sediments collected in the containment area will be removed from the Site for disposal with the landfill contents. Water contained in the storage tank will be characterized and removed from the site for disposal. A cross section of the decontamination pad construction is shown in Figure 4.

5.3.6 Subtask 2F: Roll-Off Staging Area Construction

A roll-off staging area will be constructed adjacent to the Site access road as shown on Figure 2. The staging area will hold five roll-off containers that will receive excavated material that is not consistent with the non-hazardous waste profile prepared for the landfill contents based on the characterization conducted as part of Subtask 1B. Five 20- cubic yard capacity roll-off containers will be staged in a staggered alignment to allow each to be loaded separately without moving the others.

5.4 TASK 3: WASTE EXCAVATION

Task 3 will consist of all subtasks related to excavation and removal of the landfill contents. This will include: dust control required during all on-Site activities; landfill contents excavation and disposal; the segregation, characterization, and disposal of material inconsistent with the non-hazardous waste profile; and excavation, stockpiling, and characterization of sub-grade material.

5.4.1 Subtask 3A: Dust Control

During the duration of the removal action, dust control measures will be implemented during periods of dry weather. A water truck will be used to keep work areas wet and to prevent the generation of visible dust.

5.4.2 Subtask 3B: Waste Excavation and Loading

The landfill will be excavated from east to west. A working face will be established at the eastern edge of the landfill where landfill contents designated acceptable for direct landfill disposal will be excavated and loaded directly into tandem truck trailers using a Caterpillar 235 (or equivalent) excavator.

Excavation will be monitored by a hazardous waste technician to confirm that material being loaded directly into trailers for disposal is consistent with the waste profile. The hazardous waste technician will monitor the waste visually and with the aid of a photoionization detector (PID) to monitor for the presence of volatile organic vapors. Any material that is inconsistent with the non-hazardous waste profile will be segregated and moved into one of the five roll-off bins using a Case 580 (or equivalent) loader or backhoe. The types of material that may be encountered and require special handling would include stained or contaminant saturated soil, pockets of sludge, soils inhibiting noticeable odor, paint cans and sample jars, and drums with bungs containing unknown materials.

Any grids that were determined by the in-situ characterization to be unacceptable for direct landfill as non-hazardous waste will be excavated and stockpiled for further analysis. During this excavation, any material that is visually inconsistent with the non-hazardous waste profile will be segregated and moved into one of the roll-off bins.

The trucks used will be routed through the Site in a circular pattern as depicted on Figure 2. After loading, each truck will pass through the decontamination area for cleaning before leaving the Site.

5.4.3 Subtask 3C: Segregation of Waste Inconsistent with Profile

Any material encountered during excavation activities that is inconsistent with the non-hazardous waste profile will be segregated into one of the five roll-off containers. Similar materials will be consolidated in a single roll-off until it is loaded to capacity (approximately 20 cubic yards).

5.4.4 Subtask 3D: Characterization of Waste Inconsistent with Profile

When a roll-off is loaded to capacity, the contents of the container will be sampled to determine disposal requirements. At the completion of the removal action, any remaining roll-offs with material present will also be characterized. Any landfill grids that did not meet the requirements for direct landfill during the in-situ waste characterization that were segregated in stockpiles will also be sampled and characterized. The sampling methods and analyses to be used for the characterization of these materials are described in the SAP.

5.4.5 Subtask 3E: Roll-Off Pickup and Stockpile Removal

After a roll-off container has been filled with waste that is inconsistent with the non-hazardous waste profile and the waste has been sampled and characterized, the roll-off will be manifested and removed for appropriate disposal. Similarly, after a landfill grid not meeting the requirements for direct landfill disposal has been sampled and characterized, the material will be manifested and removed for appropriate disposal.

5.4.6 Subtask 3F: Sub-grade Excavation, Stockpiling, and Characterization

Following removal of the landfill materials down to native soil, an additional 6-inches of soil will be excavated and stockpiled on Site as shown on Figure 2. This stockpile will be sampled and characterized as described in the SAP. It is estimated that the stockpile of native material will total approximately 100 cubic yards.

5.4.7 Subtask 3G: Additional Incidental Excavation and Material Removal

Contaminants of concern in concentrations above EPA 2000 Region 9 PRGs were found present soil samples taken from other areas of the Site. At the direction of USACE areas of additional removal will be identified, characterized, excavated, and removed for disposal. Following any incidental removal, confirmation samples will be taken to confirm that materials containing contaminants of concern above the cleanup action levels have been completely removed.

5.5 TASK 4: CONFIRMATION SAMPLING AND SITE CLEANUP

Task 4 includes all subtasks related to Site restoration. This includes confirmation and backfill sampling; and backfilling, grading, compaction, and seeding of the Site.

5.5.1 Subtask 4A: Confirmation Sampling

The area exposed by the landfill removal action will be surveyed to re-establish the grid used during the landfill characterization. A sample of surface soil will be collected from the center of each grid as described in the SAP. The results of the confirmation sample analyses will be compared to the COPC cleanup action levels established for the project to determine if additional soil will require removal and disposal. If it is determined that COPC concentrations exceed established action levels, an additional 6-inches of material will be removed from the grid, which will be re-sampled at the direction of the COR.

5.5.2 Subtask 4B: Backfill Sampling

An off-Site source of backfill material will be identified for use and brought to the Site to establish final lines and grades. Prior to bringing any off-Site material onto the Site, the backfill material will be sampled and analyzed as described in the SAP to ensure that the material does not contain contaminants.

5.5.3 Subtask 4C: Backfill, Grading, and Compaction

If testing indicates that the stockpile of native material removed from the base of the landfill is suitable for backfill, the material will be spread across the landfill Site and compacted. If sample analysis indicates that the material is not suitable for backfill, the material will be removed for disposal at the direction of the COR. The stockpiled material and backfill will be deemed suitable for use on Site if analysis indicates that all sample analysis meet project cleanup criteria (2002 Region 9 PRG's for industrial soil). Additional backfill material will be brought on Site and placed to provide an even grade that is consistent with existing Site drainage. Sufficient material will be placed and graded such that no slope will exceed approximately 2 percent.

5.5.4 Subtask 4D: Site Cleanup

All areas disturbed by the construction will be restored to their pre-construction condition. The gravel used to construct the haul road and turnaround area will remain in place. The portable toilet will be demobilized, and the silt fence and all temporary fencing will be removed. Erosion control provisions will not be removed without authorization of USACE.

5.5.5 Subtask 4E: Seeding

All disturbed areas will be covered with hydroseed.

Table 5.1
Cleanup Action Levels

Chemicals of Concern[a]	2000 EPA Region 9 Soil PRGs[b] (mg/kg)	2002 EPA Region 9 Soil PRGs[c] (mg/kg)
VOLATILE ORGANIC COMPOUNDS		
Dichlorodifluoromethane	310 nc	310 nc
Chloromethane	2.7 ca	2.6 ca
Vinyl chloride	0.83 ca	0.75 ca
Bromomethane	13 nc	13 nc
Chloroethane	6.5 ca	6.5 ca
Trichlorofluoromethane	2000 sat	2000 sat
1,1-Dichloroethene	0.12 ca	0.12 ca
1,1,2-Trichloro-1,2,2-trifluoroethane	5,600 sat	—
Acetone	6,200 nc	6,000 nc
Carbon disulfide	720 sat	720 sat
Methyl acetate	96,000 nc	92,000 nc
Methylene chloride	21ca	21ca
trans-1,2-Dichloroethene	210 nc	—
Methyl tert butyl ether (MTBE)	37 ca	160 ca
1,1-Dichloroethane	2,100 nc	1,700 nc
cis-1,2-Dichloroethene	150 nc	—
2-Butanone (MEK)	NE	—
Chloroform	0.52 ca	12 ca/nc
1,1,1-Trichloroethane	1,400 ca	1,200 ca
Cyclohexane	140 sat	140 sat
Carbon tetrachloride	0.53 ca	0.55 ca
Benzene	1.5 ca	1.3 ca
1,2-Dichloroethane (Ethylene dichloride)	0.76 ca	0.6 ca
Trichloroethene	6.1 ca	6.1 ca
Methylcyclohexane	8,800 nc	8,700 nc
1,2-Dichloropropane	0.77 ca	0.74 ca
Bromodichloromethane	2.4 ca	1.8 ca
1,3-Dichloropropene (DCP), total	—	1.8 ca
cis-1,3-Dichloropropene (see 1,3-DCP, total)	NE	—
4-Methyl-2-pentanone (Methyl isobutyl ketone)	NE	2,800 nc

Table 5.1
Cleanup Action Levels

Chemicals of Concern[a]	2000 EPA Region 9 Soil PRGs[b] (mg/kg)	2002 EPA Region 9 Soil PRGs[c] (mg/kg)
Toluene	520 sat	—
trans-1,3-Dichloropropene (see 1,3-DCP, total)	NE	—
1,1,2-Trichloroethane	1.9 ca	1.6 ca
Tetrachloroethene	19 ca	—
2-Hexanone	NE	—
Dibromochloromethane	2.7 ca	2.6 ca
1,2-Dibromoethane (Ethylene dibromide [EDB])	0.048 ca	0.028 ca
Chlorobenzene	540 nc	530 nc
Ethylbenzene	230 sat	
Xylenes (total)	210 sat	420 sat
Styrene	1,700 sat	1,700 sat
Bromoform	310 ca	220 ca
Isopropylbenzene (cumene)	NE	—
1,1,2,2-Tetrachloroethane	0.9 ca	0.93 ca
1,3-Dichlorobenzene	52 nc	63 nc
1,4-Dichlorobenzene	8.1 ca	7.9 ca
1,2-Dichlorobenzene	370 sat	—
1,2-Dibromo-3-chloropropane	4.0 ca	2 ca
1,2,4-Trichlorobenzene	3,000 sat	3,000 sat
Total trihalomethanes	—	—
SEMAVOLATILE ORGANIC COMPOUNDS		
Benzaldehyde	88,000 nc	62,000 nc
Phenol	100,000 max	100,000 max
bis(2-Chloroethyl) ether	0.62 ca	0.55ca
2-Chlorophenol	240 nc	240 nc
2-Methylphenol	44,000 nc	31,000 nc
2,2'-Oxybis(1-chloropropane)=[bis (2-chloroisopropyl) ether]	—	—
Acetophenone	1.6 nc	—

Table 5.1
Cleanup Action Levels

Chemicals of Concern[a]	2000 EPA Region 9 Soil PRGs[b] (mg/kg)	2002 EPA Region 9 Soil PRGs[c] (mg/kg)
4-Methylphenol	—	3,100 nc
n-Nitroso-di-n-propylamine	.35 ca	.25 ca
Hexachloroethane	180 ca	120 ca
Nitrobenzene	110 nc	100 nc
Isophorone	2,600 ca	1,800 ca
2-Nitrophenol	NE	—
2,4-Dimethylphenol	18,000 nc	12,000 nc
bis(2-Chloroethoxy)methane	NE	—
2,4-Dichlorophenol	2,600 nc	1,800 nc
Naphthalene	190 nc	—
4-Chloroaniline	3,500 nc	2,500 nc
Hexachlorobutadiene	32 ca	22 ca
Caprolactam	100,000 max	100,000 max
4-Chloro-3-methylphenol	NE	—
2-Methylnaphthalene	NE	—
Hexachlorocyclopentadiene	5,900 nc	3,700 nc
2,4,6-Trichlorophenol	220 ca	62 nc
2,4,5-Trichlorophenol	88,000 nc	62,000 nc
1,1'-Biphenyl	—	350 sat
2-Chloronaphthalene	27,000 nc	23,000 nc
2-Nitroaniline	50 nc	18 nc
Dimethylphthalate	100,000 max	100,000 max
2,6-Dinitrotoluene	880 nc	620 nc
Acenaphthylene	NE	—
3-Nitroaniline	NE	—
Acenaphthene	38,000 nc	29,000 nc
2,4-Dinitrophenol	1,800 nc	1,200 nc
4-Nitrophenol	7,000 nc	—
Dibenzofuran	5,100 nc	3,100 nc
2,4-Dinitrotoluene	1,800 nc	1,200 nc
Fluorene	33,000 nc	26,000 nc
Diethylphthalate	100,000	100,000

Table 5.1
Cleanup Action Levels

Chemicals of Concern[a]	2000 EPA Region 9 Soil PRGs[b] (mg/kg)	2002 EPA Region 9 Soil PRGs[c] (mg/kg)
	max	max
4-Chlorophenyl-phenyl-ether	NE	—
4-Nitroaniline	NE	—
4,6-Dinitro-2-methylphenol	NE	—
n-Nitrosodiphenylamine	500 ca	350 ca
4-Bromophenyl-phenyl ether	NE	—
Hexachlorobenzene	1.5 ca	1.1 ca
Atrazine	11 ca	7.8 ca
Pentachlorophenol	11 ca	9 ca
Phenanthrene	NE	—
Anthracene	100,000 max	100,000 max
Carbazole	—	86 ca
Di-n-butylphthalate	88,000 nc	—
Fluoranthene	30,000 nc	22,000 nc
Pyrene	54,000 nc	29,000 nc
Butylbenzylphthalate	100,000 max	100,000 max
3,3'-Dichlorobenzidine	5.5 ca	3.8 ca
Benzo(a)anthracene	2.9 ca	2.1 ca
Chrysene	290 ca	210 ca
bis-(2-Ethylhexyl) phthalate	180 ca	120 ca
Di-n-octylphthalate	10,000 sat	25,000 nc
Benzo(b)fluoranthene	2.9 ca	2.1 ca
Benzo(k)fluoranthene	29 ca	21 ca
Benzo(a)pyrene	0.29 ca	0.21 ca
Indeno(1,2,3-c,d)pyrene	2.9 ca	2.1 ca
Dibenzo(a,h)anthracene	0.29 ca	—
Benzo(g,h,i)perylene	NE	—
PESTICIDES AND PCBs		
Aldrin	0.15 ca	0.1ca
α-BHC	0.59 ca	—
β-BHC	2.1 ca	—

Table 5.1
Cleanup Action Levels

Chemicals of Concern[a]	2000 EPA Region 9 Soil PRGs[b] (mg/kg)	2002 EPA Region 9 Soil PRGs[c] (mg/kg)
χ-BHC (Lindane)	2.9ca	—
δ-BHC	—	—
Chlordane, technical	11 ca	6.5 ca
α-Chlordane	—	—
χ-Chlordane	—	—
4,4'-DDD	17 ca	10 ca
4,4'-DDE	12 ca	7 ca
4,4'-DDT	12 ca	7 ca
Dieldrin	0.15 ca	0.11 ca
Endosulfan	53,000 nc	3,700 nc
Endosulfan I	(see Endosulfa n)	—
Endosulfan II	(see Endosulfa n)	—
Endosulfan sulfate	—	—
Endrin	260 nc	180 nc
Endrin aldehyde	—	—
Endrin ketone	—	—
Heptachlor	0.55 ca	0.38 ca
Heptachlor epoxide	0.27 ca	1.9 ca
Methoxychlor	4,400 nc	3,100 nc
Toxaphene	2.2 ca	1.6 ca
Aroclor® 1016	29 ca	21 ca
Aroclor® 1221	1.0 ca	0.74 ca
Aroclor® 1232	1.0 ca	0.74 ca
Aroclor® 1242	1.0 ca	0.74 ca
Aroclor® 1248	1.0 ca	0.74 ca
Aroclor® 1254	1.0 ca	0.74 ca
Aroclor® 1260	1.0 ca	0.74 ca
METALS		
Aluminum	100,000 max	100,000 max
Antimony	820 nc	410 nc
Arsenic (soil by 6020)	2.7 ca	1.6 ca
Barium	100,000 max	67,000 max

Table 5.1
Cleanup Action Levels

Chemicals of Concern[a]	2000 EPA Region 9 Soil PRGs[b] (mg/kg)	2002 EPA Region 9 Soil PRGs[c] (mg/kg)
Beryllium	2,200 ca	1,900 ca
Cadmium (soil by 6020)	810 nc	450 nc
Calcium	—	—
Chromium, total	450 ca	450 ca
Cobalt	100,000 max	1,900max
Copper	76,000 nc	41,000 nc
Iron	100,000 max	100,000 max
Lead (soil by 6020)	750 nc	750 nc
Magnesium	—	—
Manganese	32,000 nc	19,000 nc
Mercury	610 nc	310 nc
Nickel	41,000 nc	20,000 nc
Potassium	—	—
Selenium	10,000 nc	5,100 nc
Silver (soil by 6020)	10,000 nc	5,100 nc
Sodium	—	—
Strontium	100,000 max	100,000 max
Thallium	130 nc	67 nc
Uranium (soil by 6020)	410 nc	200 nc
Vanadium	14,000 nc	7,200 nc
Zinc	100,000 max	100,000 nc
Cyanide	35 nc	35 nc
TPH-Diesel	—	—
		820 nc
		2.7 ca
		100,000 max
		2,200 ca
		810 nc
		—
		450 ca
		100,000 max
		76,000 nc

Table 5.1
Cleanup Action Levels

Chemicals of Concern[a]	2000 EPA Region 9 Soil PRGs[b] (mg/kg)	2002 EPA Region 9 Soil PRGs[c] (mg/kg)
		100,000 max
		750 nc
		—
		610 nc
		41,000 nc
		—
		10,000 nc
		10,000 nc

NOTES:

[a] Compounds listed for VOCs, SVOCs, pesticides and PCBs, and analytes listed for metals and cyanide are based on the EPA Contract Laboratory Program Target Compound Lists and CLP target analyte list.
[b] 2000 EPA Region 9 PRGs for industrial soils.
[C] 2002 EPA Region 9 PRGs for industrial soils.
— denotes criteria not established

ca = cancer
max = maximum soil contamination level
NA = not applicable
nc = noncancer
PRG = preliminary remedial goal
sat = saturated soil

Table 5-2
Landfill Removal Action; Data Quality Objectives

Investigation Objectives	Data Requirements	Investigation Strategy	Field Decision Criteria/Performance Specifications
Soil Sample Collection			
Determine concentrations of contaminants in landfill soil.	Confirm presence and degree of contamination in sampling grids to create waste profile.	Complete 24 test pits in the landfill and collect one soil sample representative of the fill material from each test pit. All samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, metals, and cyanide.	The soil sampling locations will be determined by a surveyed sampling grid.
Waste Sample Collection			
Determine characteristics of waste material encountered during landfill removal actions.	Confirm waste contents in order to determine appropriate disposal options.	Waste will be segregated upon discovery and sampled as necessary in stockpiles or bins.	The waste sampling will be completed when waste is encountered that does not meet the pre-determined non-hazardous waste profile, as necessary.
Confirmation Sample Collection			
Determine concentrations of contamination in the native soil underlying the landfill.	Confirm removal of all contaminated soil.	Collect one soil sample representative of the native soil from each sampling grid and analyze each for VOCs, SVOCs, pesticides, PCBs, metals, and cyanide.	The soil sampling locations will be on the same sampling grid system as the samples collected for characterization of the landfill contents.

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APPENDIX A

SAMPLING AND ANALYSIS PLAN

APPENDIX B

SITE SAFETY AND HEALTH PLAN

APPENDIX C

CONTRACTOR QUALITY CONTROL PLAN